LAURENS H. SILVER (SBN 55339)
CALIFORNIA ENVIRONMENTAL LAW PROJECT
P.O. Box 667
Mill Valley, California 94942
Telephone: (415) 383-5688
Facsimile: (415) 383-7995
Attorney for SIERRA CLUB

BEFORE THE CALIFORNIA

STATE WATER RESOURCES CONTROL BOARD

In the Matter of Draft Cease and Desist Order No. 2008-00XX-DWR Against California American Water Company

TESTIMONY OF SIERRA CLUB WITNESS MARCIN WHITMAN

1. <u>General Qualifications</u>

1. My name is Marcin Whitman. I am a Senior Hydraulic Engineer with the California Department of Fish and Game ("DFG"). For the past ten years, I have worked on coastal fish passage and river restoration projects on behalf of DFG, based out of our agency's Sacramento headquarters. I have provided engineering expertise on projects such as include fish passage facilities at dams and debris basins, passage facility refurbishing and modification, dam removals, and redesigning road crossings that act as fish passage barriers.

2. I hold a Master of Science degree in Agriculture Engineering from the University of California at Davis, with a specialization in aquaculture engineering.. In addition, I hold a Bachelor of Arts degree in Biology from the University of California at Santa Cruz, with a specialization in marine biology. Finally, I hold a Bachelor of Science degree in Naval Architecture and Marine Engineering from the Webb Institute of Naval Architecture.

3. I am a licensed civil engineer in the State of California, License # C52922

4. During my professional career, I have developed significant knowledge of fish passage requirements. Specifically, I have a working knowledge of fishery management principles including river hydraulics, swimming and migration behaviors of fish, engineering, and fish passage principles. This knowledge was developed during the performance of dozens of projects on behalf of both DFG and the National Marine Fisheries Service ("NMFS"), where I was the lead engineer for the Southwest Region for nearly nine years. My work for both of these agencies have involved me in the lead role on conceptual design and/or reviewing design work of others for compliance with fish passage requirements, guidelines, and criteria. I have provided engineering design or design review on the following projects: a) Potter Valley Project, Federal Energy Regulatory Commission ("FERC") Project 77; b) DeSabala-Centerville, FERC Project 108; c) Red Bluff Diversion Dam, fish passage facilities and experimental pumping station; d) Glenn-Colusa Irrigation District fish screen; e) Reclamation District 108 fish screen; f) Anderson-Cottonwood Irrigation District Dam ladders and screens; including Bonnyview fish screens; g) Maxwell fish screens; h) Harvey Dam ladder and screen; i) Freeman Dam ladder and screen; i) Robles Dam ladder and screens and k) Keswick Stilling Basin j) Robles fish ladder and screens

5. I have offered my engineering expertise during public testimony on numerous occasions, including but not limited to: a) testimony at a United States Senate briefing on fish passage and dams during a presentation on dams and rivers by the Aspen Institute in July, 2003; b) participation in a United States Congressional Office of Technological Assessment discussion and report on experimental technology in fish passage; and c) testimony on behalf of NMFS during litigation regarding the installation of new fish screens at the Glenn-Colusa Irrigation District's point of diversion on the Sacramento River. d) Testimony before the State Board concerning Bradbury Dam on the Santa Ynez River

6. I have participated in the design and execution of feasibility studies for fish passage at dams. In particular, I have participated in such work on Keswick Dam, Red Bluff Diversion Dam, Anderson-Cottonwood Irrigation District's diversion dam, several dams associated with the Battle Creek

FERC project, more recently Robles Dam on the Ventura River, Watsonville municipal diversion dam on Correlitos Creek and Stanford University's diversions on the San Fransquito system as well as others.

2. **Specific experience with Carmel system**

In 1991 started participating in Fisheries Team. Since then have contributed to fish passage efforts at Los Padres, San Clemente, Old Carmel and Dormany Dams on the Carmel system, when requested by agency biologists and as time allows.

3. **Existing conditions of upstream passage at Los Padres dam**

There are two trap and haul systems, each with its own shortcomings:

The Old Trap

This has been in operation since the 1950s with periodic modifications. The trap has a denil [roughened chute type fish ladder] leading to the trap and can run attraction flows up to 8 cfs. The bottom end and attraction jet from the denil get submerged and reduce in effectiveness at higher flows. After initial years of operation, a gabion weir [a series of caged rocks, attempting to form a grade control and barrier] was added to guide fish into trap. In the summer of 2004, these gabions were partially replaced by rock weirs [a series of large and small rocks, placed in a specific pattern, also attempting to provide grade control but provide passage for fish] was placed in an effort to guide fish past the old trap and into the pool upstream where the new trap is. Operation of the old trap requires netting the fish for transfer to the transport truck.

The New Trap

In operation since the 1990s, this trap has been used in conjunction with old trap each year till 2008. This trap has steeppass [another type of roughened channel ladder, usually more challenging to pass] as an entrance to the trap, .which is perched at some low flows. Jets have been added to entrance pool of ladder to provide additional attraction. Total maximum flow, including attraction, is about 14 cfs. The steeppass faces upstream (to attempt attraction of fish from spillway discharge at low flows) and so is misoriented for circulation patterns at high flows. Trap is operated for water to water transfer to transportation truck.

Deficiencies

Both traps have a number of deficiencies. Fundamental to both is that there is far too little attraction flow to readily draw fish into the trap in all but the lowest flows. Typical ladders on river of this size have 10% or more of the total flow of the river discharging from the ladder (ladder and attraction water can be combined to make up this total) in order to provide adequate attraction to a well-placed ladder entrance [NMFS, 2008]. Since flows during upstream migration periods range to 400 cfs and beyond, fish are delayed or blocked in their passage during a large portion of their migration window. Delay can have an especially serious impact in Central and Southern California where the windows of opportunity for passage in the watershed above the dam can be short.

In addition, attraction water is usually added in an entrance pool where the attraction water is diffused. The operating principle for this arrangement is that the attraction water serves to help attract the fish from the spillway or other competing flows to the general area of the fish ladder entrance but is diffused so that at the ladder the entrance, fish will quickly choose the fish ladder flow and not be delayed by competition from the attraction water. [NMFS 2008, WDFW 2000] The new trap lacks this sophistication in its attraction water and the old trap has no attraction water at all.

Besides quantity of water, the other important factor in fish entrances is location [NMFS 2008, WDFW 2000]. A fish ladder must have a combination of entrance locations, placed near where they are being delayed by a barrier, that quickly attract fish away from any competing spill (e.g the dam spillway) and into the channel entrance over the entire range of passage flows. The ladders at both these traps lack optimal placement and guidance.

The old trap required the transfer of fish from the trap to the truck by means of a net. Both the trapping of a fish by a net and carrying the fish through the air provide a heightened level of stress over natural or fishway passage.

In addition, both traps use a roughened chute type ladder. Although sometimes still in use as an inexpensive or temporary fix, many of these type of ladders have been replaced in California and in the Northwest the use of is primarily limited to counting/evaluation facilities or a temporary fix [WDFW

2000]. One reason this type of ladder has fallen out of favor is that it requires the fish to move through high velocities over a set distance. A proportion of the population, which would be able to negotiate a natural stream channel or a fish ladder with incremental steps and always available resting pools, are blocked or delayed by this type of passage. The longer or steeper the roughened chute, the more delay or blockage. Also, it is paramount that entrance a roughened chute ladder be well submerged – entrance to the jet of high velocity water should be a swim-in condition not requiring a jump on the part of the fish. My understanding is that, even with the new rock weirs to provide better grade control, the entrance to the new trap steeppass is not adequately submerged over the full range of fish passage flows.

Possible improvements

After considering the circulation, aeration and diffusion patterns of the dam spill over the full range of passage flows, a single facility, well positioned and readily accessible with multiple entries to operate over the full range of targeted flows could be built. A successful facility would incorporate adequate attraction water and guidance. Lift over the dam could continue to be provided by a trucking facility. Other options are a fish lift (which is used at multiple sites on the East Coast or a ladder (though there are limited ladder over 150 ft in operation) A fish ladder was considered for the even taller New Los Padres. A fishway would have the added benefit of being able to provide a downstream passage route (see below).

4. **<u>Existing conditions of downstream passage at Los Padres Dam</u>**

Downstream migrating fish must pass from the natural stream system above the reservoir into the delta of the reservoir, through the reservoir and then over the spillway and into the receiving pool at the bottom of the spillway before returning to a natural riverine environment.

Deficiencies

The reservoir is seasonally drawdown every year. Downstream migrants (kelts and juveniles) must pass by means of the dam spillway. This first requires the reservoir to refill in the fall to adequate levels to spill.

During periods of low flow - between storms and at the end of the wet season - downstream velocities within the reservoir become hard to track for downstream migrants, residence time in the reservoir becomes long and water quality and predation can make for difficult passage.

Transit over the spillway can cause stress and injury. This routing is especially severe for any kelts as they are more sensitive to shallow depths and long drops.

Possible improvements

Efforts have been made in other systems with similar problems to improve passage. Options include: removal of exotic species, installation of isolated bypass facilities (Isolation of passage in the reservoir and down the dam face can be considered separately or conjunctively. If a fish ladder was added for upstream passage, this could also provide a superior routing for downstream passage of the dam face), accelerated movement of downstream migrants and collection (which could also be used during non-spill periods) by means of a device such as a gulper [an guidance and collection device that provides an artificial current].

5. **<u>Suggested studies, course of action and timelines</u>**

In the early 90s, the management approach for the basin was the addition of at least one large reservoir and preliminary concepts for passage improvement were oriented around an enlarged reservoir. As late as 2000, this was still the approach (R2 study, May 2000). Since then, the concept of an enlarged reservoir has been abandoned but coordinated, consistent, concerted effort towards a long-term solution to passage at Los Padres has not been pursued. Instead there have been short-term, piecemeal efforts at incremental improvement by various parties.

The best way forward would be to convene a working group of technical (biologists, engineers, geologists) staff of involved parties (e.g. Cal-Am, NMFS, CDFG) and report periodically to pertinent management. This working group should be tasked with identifying data gaps (3-6 month depending on whether outside area reviewers are sought), conducting short-term studies (1-2 winter seasons), setting operational goals and deriving/selecting options (simultaneous with short term studies, concluding by Spring 2010) for bringing downstream and upstream fish passage to current standards within a reasonable but certain timeframe. After selection of preferred concepts (Spring 2010 or earlier), detailed design, permitting and construction should be contracted out to (a) qualified consulting/construction firm(s) (completed by Fall 2011-2012 depending on scope of solution).

Conclusion

Such a process as outlined immediately above has proven successful at many other sites throughout my career. Given the current sub-standard passage conditions at Los Padres Dam and the suite of alternatives available for improvement, I believe that such a course of action would result in substantial improvement of both upstream and downstream passage at Los Padres, allowing for a fuller expression of anadromy in the upper part of the watershed.

References:

NMFS (National Marine Fisheries Service) 2008 Anadromous Salmonid Passage Facility Design. NMFS, Northwest Region, Portland, Oregon.

WDFW (Washington Department of Fish and Wildlife) 2000 Fishway Guidelines for Washington State.